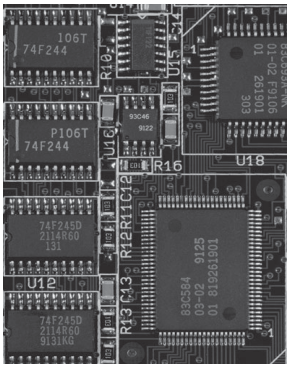

New Maps for Technology in Teacher Education: After Standards, Then What?

Marvin Cohen and Bill Tally

Abstract

The ISTE (International Society for Technology in Education) Standards have put technology integration "on the map" for teacher educators, creating a useful reference point for guiding new teachers toward appropriate technology uses. The authors reflect on their work at a progressive teacher education college, assessing the strengths and limitations of a standards-driven approach to integrating technology. They describe a framework that organizes faculty and student technology learning around four themes: communication and dialog, inquiry using primary data, student constructive projects, and digital literacy. This "map" is not proposed as a specific model to be adopted by other teacher educators, but rather as a stimulus for other faculty to build their own maps, reflecting their institutions' core goals, values, and circumstances.

Everywhere you turn in education these days, the debate about standards looms large. Yet in the sometimes rancorous arguments over standards, some basic truths often get overlooked: We need coherent standards, for standards are maps of where we want to go as educators. However, standards are highly incomplete maps, for they show only one point—our destination. They don't show us our starting point, or more important, how we ought to try and get from one to the other. If we are to improve significantly the teaching of all children, teacher educators must adapt general standards to reflect their own local conditions and values. We need to create and pursue our own maps of educational change.

This is as true in educational technology as elsewhere. The International Society for Technology in Education (ISTE) published standards for K–12 teachers (NETS•T) in 2000, setting out what they should know and be able to do as proficient users of technology in the classroom. The standards are intentionally broad, to leave room for the tremendous variation in teacher education programs. They call for new teachers to demonstrate mastery in general computer operations, in content-specific applications, in evaluating software and Web material, in gathering and managing information, in creating and publishing multimedia products, in communicating and working with others electronically, in thinking critically, and in acting ethically with technology. These benchmarks are lucidly organized under headings that make sense to teacher educators, and are illustrated by a host of compelling classroom examples or "performance profiles" that bring them to life.

The NETS•T have had a salutary influence on teacher education. Most important, they've created a common reference point where there was none before. Teacher educators and administrators routinely refer to them in professional meetings and publications, and the accreditation process for teacher colleges, such as the National Council for the Accreditation of Teacher Education (NCATE), have incorporated their criteria into the ways they evaluate teacher preparation programs. Colleges of education have begun using ISTE's NETS•T to rethink the ways they train new teachers, an effort that gained momentum with the federal Preparing Tomorrow's Teachers to Use Technology (PT^3) program. In short, the NETS•T have created a set of demands—and have richly illustrated the kinds of classroom practices that might lie at the journey's end.

Four years after the appearance of technology standards, however, most teachers colleges have a mixed record when it comes to preparing new teachers to use technology. As in other academic disciplines, most faculty came of professional age before e-mail and the Internet; they've been occupied with learning to use technology personally and professionally—outside the classroom—rather than in. Recognizing this, the U.S. federal government created the PT^3 program, which has supported thousands of education faculty in using technology during the past three years. PT^3 is making an important difference in teacher education. According to data collected by the government, nearly 15,000 participating faculty now feel that they are "technologically proficient." Participating colleges of education report that faculty and students are using technology most frequently for

"communication, for gaining access to information resources and media, and for student projects or presentations" (PT³ Grant Management, 2002, p. 3), i.e., for e-mail, Internet research, and PowerPoint presentations. This is a start, and a valuable one. But these do not appear to be the outcomes depicted in ISTE's NETS•T, where technologies are seamlessly woven into curriculum in support of higher-order thinking in the disciplines. We still lack the data that would tell us whether PT³ investments are improving new teachers' ability to use technology for the benefit of the children they teach.

Why is the infusion of technology into teacher education proceeding so slowly? There are a host of possible reasons, but two are heard most often. One argument holds that the problem lies with technology itself—it is not as vital to teaching as some suppose, or it is too complicated or unreliable, so that teachers and teacher educators rightfully reject it. The other argument is that the problem really lies with teachers and teacher educators—e.g., they are afraid or mistrustful of technology, have little experience with it, do not come from a "wired" generation, etc. This second explanation, as Cuban (2002) has pointed out, has to deal with the fact that most of these same teachers use computers frequently in their personal life (e-mail and shopping) or for their scholarship (word processing and research).

A third, more plausible possibility is that technology infusion takes a long time because, like any change in teaching, it is a complex institutional process that, in order to succeed, must be guided by the intelligent judgement of professional teachers. Looked at this way, it may be that ISTE's NETS•T are partly to *blame* for the slow pace of technology infusion in teacher education programs. Or rather, the way we have *treated* the standards has been to blame. Instead of viewing the NETS•T as a *starting place for faculty learning and conversation* about technology and teaching, we too often interpret them as a blueprint for a house to be built. This is the risk of all standards, and particularly technology standards: disconnected from a faculty-driven process of inquiry, creative application, and learning, they can easily become *impediments* to change. In form, they can appear at once overwhelmingly detailed and vague. They can be used to design workshops and learning experiences that treat technologies as neutral tools, or as ends in themselves that fail to help faculty pose the critical "why bother?" question about technology use. Standards can easily be treated as bureaucratic benchmarks only, violating their intended spirit. In an informal survey of education school Web pages, we found a number of program descriptions in which titles of existing courses had been slotted in beneath each of the standards—reflecting administrators' well-meaning efforts to demonstrate that students are being adequately prepared. The risk with this kind of "check-off" approach to meeting standards is that faculty "ownership" over technology can remain weak; too many faculty, and hence too many students, remain aloof from technologies as teaching and learning resources.

In order to realize the promise of ISTE's NETS•T, it is critical for education faculty to work together—within and across colleges of education—to build their own "maps" to technology integration, driven by an evolving sense of *why* technology matters to them, and why it should matter to their students as education professionals.

At Bank Street College of Education, we have been building and revising our own map of technology integration for the past several years, and it has guided us in a wide variety of activities, from selecting initial technology tools to focus on and designing faculty workshops, to revising courses and creating college-classroom research partnerships. Our technology work is not a smooth curve, but a record of starts and stops, steep learning, and frequent frustration and questioning, but what we have achieved—and we believe it is considerable—owes much to the map that we have chosen to draw as we go along.

Our map is both a portrait of desired skills for students, and a sketch of the terrain on which we have set ourselves to work and learn. As such, the map suggests the set of values that this faculty shares, and allows us to fine-tune our goals as we develop as technology users. Above all, our goal has been that faculty come to "own" technology themselves, and come to *collectively* steer the process of infusing technology into teacher education courses, in a critical as well as creative fashion.

The Bank Street map (Figure 1) envisions technology's value for children and teachers along four dimensions: *Communication and Dialogue*, *Inquiry Using Primary Data, Student Constructive Projects, and Digital Resources.*

There are several things to note about the map.

First, each of the four main dimensions is one way of realizing what faculty have decided is the overarching goal of all the technology work they do—expanding new teachers' capacity to address the needs of diverse learners. Consensus on this overarching goal was reached at Bank Street in a series of faculty meetings, and it was decided that integrating technology would be a key way of working toward the goal.

Second, the map gives primacy not to technologies themselves, but to pedagogical *purposes* that can animate and organize teachers' and children's activity. Though each purpose has its associated technology tools, many tools cut across purposes. The Web is both a source of primary data for inquiry and a means of student expression. A digital camera is valuable for capturing and analyzing primary data (e.g., children's block constructions) and also for multimedia authoring (e.g., in creating photo essays about work that neighborhood people do). Faculty using this map are learning to look at technology through the lens of significant purposes.

Third, the four dimensions—the purposes for technology use—reflect the core values and philosophy of Bank Street as an institution. At Bank Street, in keeping with a legacy of progressivism, authentic experience and data are valued as the core of the inquiry process. Communication and dialogue are privileged as a mode of instruction for students, and are institutionalized in the Advisement process every student undertakes. The development of student voice, expressive

capacity, and authorship are viewed as key elements of the learning process. A focus on critical evaluation of the *forms* of learning and communication is constant as well.

Fourth, the map admits constant tinkering and change, yet within definite avenues of inquiry. During the course of the three years, the focus of our technology efforts have shifted as faculty has become aware of the variety of tools and the opportunities and limitations they entail. An early emphasis on dialogue tools (which had faculty across the institution using Web-based conferencing tools as a way to deepen and extend classroom discourse) gave way to use of the Web as a source of authentic data. More recently, faculty have been using digital video as a way for students to capture and analyze child behavior and PowerPoint as a medium of authoring and expression.

How, at Bank Street College, is technology use driven by local values as well as external standards? As an example, students at Bank Street learn to emphasize teaching with primary sources and through real-world experiences for children. When learning about the Web, then, they learn how the medium can amplify this kind of learning. They learn how kids can "mess around" in archives of primary documents and photos of immigrant life at the turn of the century, gaining a richer and more nuanced sense of the past; or they learn to use the Web to immerse children in an artist's life and work before a visit to a museum where they will see the artwork up close. By the time they graduate, we also expect our teacher candidates to understand the potential of PowerPoint or other multimedia authoring tools in helping diverse learners express what they know.

The faculty development model that underlies our technology map-making and exploration at Bank Street includes several features that have worked well:

Technology workshops designed to address faculty interests. These introduce skills with particular tools (e.g., conferencing software, Web browsers, PowerPoint, Inspiration, and iMovie) but always in the context of concrete, pedagogically sound activities.

One-on-one coaching from instructional technologists and student "Tech Fellows" as faculty begin to implement technology in their courses.

Exploration of technology integration in K–8 classrooms. Faculty can study technology use where it matters most, in the K–8 classroom, in several public schools where we have established ongoing "laboratories."

Reflective practice. All participants are expected to write short, reflective reports about the impact of the technology on their teaching.

Release time for faculty. A critical component.

Organized ***sharing of success*** locally and at national conferences. Technology Street Fairs have become an important annual event

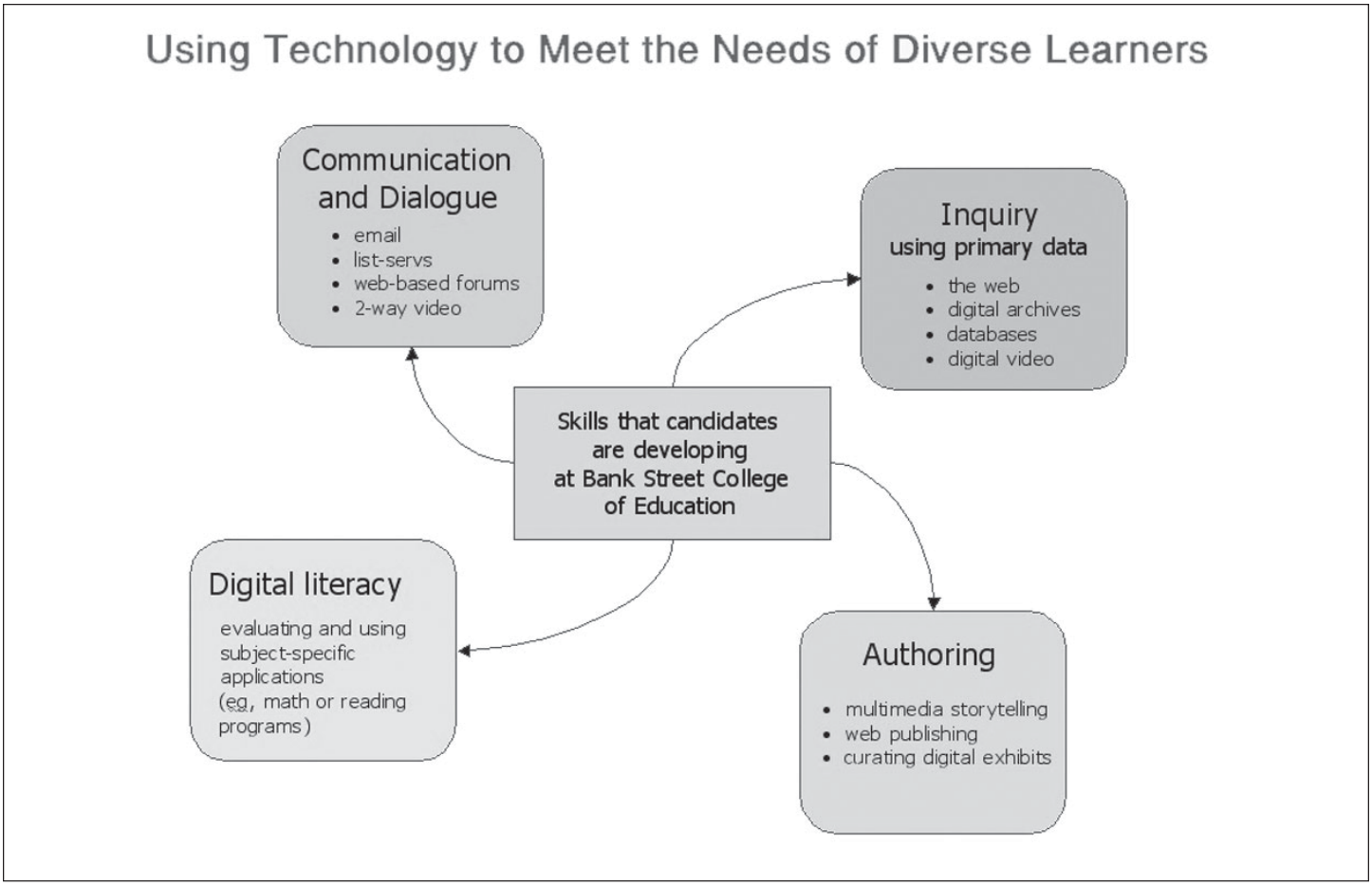

Figure 1: Bank Street College's "map" of technology goals for teacher candidates

at the College. These are opportunities for colleagues to learn from each other's work, and see how technologies are used in ways consistent with our institutional goals. Presentations at national conferences have been supported through travel stipends.

Review by peers and colleagues from other institutions as critical friends. The primary external evaluation process is an annual visit of several "critical friends"—faculty from prominent institutions around the country, chosen for their expertise and the values they share with us, who come to observe and critique our work.

A strong culture. Bank Street has benefited from the fact that we are a medium-sized program with a clear institutional mission and strong faculty culture. This has enabled faculty to reach consensus on the values and goals that they want to pursue, and to work together on projects and courses.

The results of our work have been substantial, if sometimes uneven. Most of all, the work has led to the emergence of a culture of technology use in which faculty use and teach with technology habitually, and see it as an intrinsic, if often problematic, part of the learning environment for graduate students and K–8 children.

Faculty ownership of technology is particularly high and takes varied forms. Some faculty members have embraced technology mostly as teaching aids in their own graduate classes—for example, by having students create multimedia essays, discuss course readings with the authors through the Web, and analyze digital video records of child behavior. Other faculty have taken a research tack and are partnering with teachers and graduate students to study children's technology use in K–8 classrooms — the Web for research, video as a storytelling medium, multimedia composing as a literacy tool. Still others are designing and developing new technology applications that other teacher educators can use—video "cases" of mathematics learning, Web forums for new teachers.

But "ownership" does not mean that faculty are technology enthusiasts. In each of these areas, faculty have encountered obstacles, setbacks, and frustrations. Technologies have, at times, been unstable and difficult to use. Preparing students to use them has taken time away from other valued activities. Student's technology work, even when promising, has sometimes not been deep enough to erase doubts about whether it is worth all the time and trouble.

Instead, faculty have come to "own" technology as a *problem*, as a *set of questions* about their practice and the practices of new teachers. What are the unique properties of the new technologies? What skills and sensitivities can they help me cultivate in my students? What risks to the learning experience do specific technology uses entail? How as educators do we organize technology learning so that it supports the habits of mind we want to cultivate and avoids the ones we do not? We feel that new teachers who have learned to use technology in the context of question-posing of this kind will be in a different—and far better—position to continually adjust their instruction to take best advantage of evolving digital tools as part of a suite of tools for educating diverse learners.

An illustration of how this "problematizing" of technology has worked may be helpful. Social studies faculty member Sharon was preparing to teach her graduate students how to use the Web in the social studies classroom when something began nagging at her. She found that most exemplary uses of the Web in social studies called for students to be relatively independent inquirers—following what are popularly called "WebQuests." But this did not square with something she had observed both in her graduate students and in K–8 children: that while Web users seemed to be engaged in their tasks, they tended to treat the material they encountered very superficially, skipping lightly over text, focusing on images, and quickly moving from one link to the next, never lingering very long. Sharon decided to study fifth graders' use of the Web more closely, in a diverse urban classroom with plenty of good network access. She found that despite their ease browsing popular entertainment Web sites, the mostly low-income, Latino students faced a host of difficulties using the Internet for even simple academic tasks—extracting information from a Web page, determining the source of the information, and grasping the scale of objects represented. The experience called her attention to the possibility of the "second digital divide"—that even after they have network access, these children from traditionally underserved backgrounds may fall further behind their peers if they are not helped to learn the more formal information skills needed to use the Web for academic tasks. The remedies she constructed in order to teach these children to do Web research—drawing tasks to slow them down and focus their attention, printed logs to organize their information gathering, tutorials that combined technology learning with content learning—are now integral to what she teaches her graduate students about the Web. She is also involving graduate students in follow-up studies of children's Web use in classrooms.

The result is that Sharon's teacher candidates will enter the classroom not simply knowing how to use the Web, but how to *think* about the Web as a set of teaching opportunities *and* an ongoing set of teaching challenges. Appropriately for a social studies course, and for Bank Street's progressive tradition, Sharon's work not only helps clarify best practices in teaching with the Web, but it also leads outward to issues of social equity. How are new technologies like the Web broadening our definition of a literate person? What skills and habits do *my* students bring into the classroom? How can I help *all* students develop the kinds of information literacy they need to be successful in an ever more information-oriented society?

How has having a map helped faculty learners like Sharon? Several factors seem important. First, a map allows you to see yourself on the terrain even when you are a rank novice. Perhaps more important, it allows you to *talk* about what you're trying to do before you fully understand what you're trying to do. This accords with approaches to literacy that show a big part of the challenge is "getting in the dialogue"—participating as a recognized member of the community's "technology-using educators."

Second, a map enables you to grasp technology tools in their larger functional role—to avoid becoming mired in the details of specific computer programs and technical skills. Faculty have

reported that the Bank Street map helped "organize the chaos" of technology options for them. This is also important because technologies *change* so rapidly. Yesterday's CD-ROM databases become today's online archives, and tomorrow they will morph into some vast "personalized" digital library. Without categories—such as "inquiry using primary data"—that name the potential educational utility of these different things, educators and students are left in a meaningless game of catch-up to the latest technical fad. Educators who hook their vision of technology use on specific software programs or hardware tools will not prepare students for next year, much less five or ten years from now.

Third, a map enables you to get to the "why bother?" of technology use. This is important because the difficulties and frustrations of learning and using technology are substantial. Faculty report that it is much easier to deal with particular setbacks if you know *why* you are using technology and where it fits from a larger perspective. Sure the printers jam, and students waste time typing the wrong URL, but if you think that having students mess about in online archives of primary documents will help them think and talk more like historians, it may be worth it.

Fourth, a map helps focus faculty on continuous improvement. It is less a list of skills to be achieved than a problem-space to be elaborated over time, with new questions, new challenges, and new projects. Acknowledging that technology is a shifting terrain with shifting demands helps faculty appreciate that students do not need commanding knowledge order to navigate skillfully and make informed decisions about instruction.

New maps for technology integration will be different for each institution—one size will *not* fit all. Nevertheless, we can point to a few things that a good map will likely have.

A sense of identity and mission. First, a good map is grounded in a sense of identity and mission, at whatever level of the education program. At most institutions there are substantive interests, commitments, and passions that cut across faculty, within specialization, or program-wide. For example, faculty may share an abiding interest in helping students attain sensitivity to special needs children, to social justice issues, to social science inquiry, or to developmental nuances in children. A good map will reveal something about the faculty who are using it.

A prominent place for the "Why?" A good map will highlight the "Why" of technology use, enabling faculty to ask themselves, over and over, what value the medium has for children, for their teacher candidates, and for themselves. Without this critical reflection, technology use is just tinkering.

A process of development. Finally, a good map will support a *process* of faculty learning and development—one that includes all the things we know to be important to technology learning: (a) awareness of what the technology has to offer, (b) opportunities to explore technology integration in classrooms, (c) time to learn the technology themselves, (d) application of technology to their teaching, and (e) reflection on the consequences for teaching.

Maps and Teacher Education

Although not all maps are road maps, they are opportunities to see yourself in your local geography. They are important because they allow you to situate yourself and decide on both ideal and realistic approaches to going places. It is not realistic for one map to serve us all, because our geographies are so different: in the contours of the landscape, the mountains to climb, and the things that we hope to find when we reach our goal. It is for this reason that it is important for us all to begin our journey by looking at a map to identify the landmarks that will help us know if we are heading toward a goal we seek and value. Without such a perspective, we run the risk of being lost in an unfamiliar terrain. Even if we enjoy the sights, we may find them to be only loosely connected experiences, instead of critical points in our journey toward professional growth.

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